

TNPG and those who stay with the AEA. Members of the Engineering Group face a double uncertainty, both because their group is in danger of extinction and because it is by no means certain what will happen to them after the PFR is complete. The AEA intends to place two contracts with TNPG for the development of the system; one is a management contract for the completion of the PFR, under which the AEA will reimburse TNPG for the cost of the work and pay a fee for management services provided by TNPG, and the other will cover subsequent design and development work needed to bring the fast reactor to a state for commercial exploitation.

Those members of staff who do transfer to TNPG have been told by the AEA that they cannot expect to be re-employed by the authority if anything goes wrong with the development of the commercial fast reactor. This is in contrast with the original terms of employment by the AEA, which provided for redundant staff to be re-employed somewhere in the Civil Service. Although the AEA maintains a public attitude of confidence in the ability of TNPG to develop the fast reactor, it is unwilling to back this up by offering "return tickets" into the AEA to staff who transfer.

The Institution of Professional Civil Servants, which has never approved of Mr Wedgwood Benn's plan, has now come up with an alternative programme which it believes could rescue the situation. It has suggested that Mr Benn should accelerate the formation of the Atomic Energy Board, and make it a much stronger organization than was envisaged either by the Select Committee on Science and Technology or by Mr Benn's original statement. The board would have its own fast reactor experts, who would let appropriate contracts to the two nuclear companies and to the AEA. There would be only one design team, which would be part of the board, or part of the AEA under the control of the board. The IPCS emphasizes that the board would have to be strong and technically competent, or control of the project would tend to be taken over by a proliferation of design offices in the two companies, the AEA and the Central Electricity Generating Board. The present arrangement will in fact lead to four design offices, in the two companies the AEA and the CEGB, and the provision of a strong central body could help considerably to bring the work together and concentrate it. The proposal has at least this to commend it; it would be possible for Mr Benn to adopt it without loss of face, as the formation of the AEB formed part of this original proposal. At the same time, the single coordinating and controlling board would do something to satisfy those who believe that there should be only one nuclear organization in Britain.

Meanwhile, the SGHWR is in limbo, with neither nuclear company eager to take it up. Its future rests, in fact, with the CEGB; if it shows interest in building a commercial SGHWR, one or both of the nuclear companies would doubtless tender. But the main hope of the SGHWR was in export markets, where it has been vigorously promoted by the AEA. If neither of the companies is willing to follow this up (and the early evidence of export promotion does not inspire confidence), then the expenditure on the SGHWR system is likely to have been wasted. In circumstances like these, it is inevitable that there will be a searching inquiry when next the nuclear power industry is discussed in Parliament.

## APOLLO PROGRAMME

# Dress Rehearsal

from our Astronomy Correspondent

APOLLO 9, which was launched on February 28, will go through the motions of a landing on the Moon but in the comparative safety of an Earth orbit. The enterprise involves the first testing in space of the lunar module which is to ferry men from the command module to the lunar surface and back again. The trials include a manned flight of the lunar module on a trajectory of the kind planned for the Moon landing. The pilot of the lunar module will go outside for two hours, and during their 150 orbits of the Earth the three-man crew will have ample practice at shuttling between the two spacecraft.

Most of the activity which makes Apollo 9 NASA's busiest manned mission yet is crammed in the first five days of the ten-day flight. This is to ensure that as many as possible of the more important tests are carried out if the flight has to be cut short. The remainder of the mission is as much as anything an endurance test to verify that the spacecraft systems—and the men within them—can last the duration of a trip to the Moon and back.

The first manoeuvre which the three-man crew have to carry out begins 2.5 hours after launch, when the command module attached to the service module—a 22 foot long cylinder containing a rocket motor and nuclear equipment—is detached from the third stage of the Saturn launcher. When the separation is about 50 feet, the command and service modules are turned through 180° so that the conical point of the command module can fit with the lunar module still attached to the third stage, from which the three components of Apollo 9 are then separated. The third stage will then be sent out of the way into a solar orbit.

After two days of tests and optimization of the orbit, the spacecraft commander James McDivitt and the lunar module pilot Russell Schweickart will visit the lunar module through a connecting tunnel, leaving behind the pilot of the command module David Scott. On the fourth day, McDivitt and Schweickart go back to the lunar module for more tests and for Schweickart to try to transfer to the command module and back via the exterior of the coupled spacecraft—a test of the procedure for rescuing the crew of the lunar module. The following day, McDivitt and Schweickart again transfer to the lunar module to simulate preparations for a descent to the surface of the Moon, followed by separation from the command and service modules and a sequence of manoeuvres which will take the lunar module to a distance of up to 109 miles from Apollo 9.

During this phase of the activity, lasting 5.5 hours, the intention is that the relative positions of Apollo 9 and the lunar module should represent a lunar landing. Afterwards, McDivitt and Schweickart will return to the command module, the lunar module will be jettisoned and the flight will become less hectic. Various exercises are planned for the sixth to the tenth working days, including some photography to see what sort of information the Earth survey satellites might gather. Separation from the service module and splashdown of the command module in the west Atlantic will be just under ten days after launch. If all goes well, there will be great optimism about the next two Apollo flights to the Moon in May and July.